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Publishers' Announcement.

The corporate name of the publishers of the Journal of Educational Psychology was changed, by authority of the court, on April 15, 1910, to

WARWICK & YORK, Inc.

The publication office has been removed to Light, Lombard and Balderston Sts., Baltimore. The editorial office remains unchanged at 1032 Sterling Place, Brooklyn, N. Y.

The publication day, heretofore the 20th of the date month, will be changed in the fall to the 1st of the date month with the exception of the September number, which will be issued each year toward the middle of the month in order that it may not reach its destination before subscribers return home from their summer vacations.

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FORTHCOMING ARTICLES.

THE JOURNAL OF EDUCATIONAL PSYCHOLOGY for *June* will contain the following articles:

C. E. SEASHORE and E. A. JENNER, University of Iowa. *Training the Voice by the Aid of the Eye in Singing.*

An important application of the results of technical, psychological research to the problems of vocal training. Of great interest to singers and vocal teachers as well as to psychologists.

J. P. GILBERT, University of Illinois. *An Experiment on Methods of Teaching Zoölogy.*

Special methods are usually matters of tradition or opinion. Dr. Gilbert's article describes a careful, scientific test of two methods of presenting elementary zoölogy. Such tests will greatly increase the effectiveness of secondary education.

DAVID SPENCE HILL, Peabody College for Teachers, University of Nashville. *An Experience With Correlation and the Class Experiment.*

The author gives an account of a memory experiment which should be of especial value to teachers of educational psychology.

THE JOURNAL OF EDUCATIONAL PSYCHOLOGY,

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THE EFFECT OF PRACTISE UPON THE RANGE OF VISUAL ATTENTION AND OF VISUAL APPREHENSION.[1]

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SUMMARY.

Two sets of experiments were conducted to determine the effect of practise upon quick visual perception, with special reference to the usefulness of specific "exercises in mind-training," such as have been recommended by Miss Aiken.

In the first set of experiments (range of attention), 5, 6 and 7-place series of isolated letters were exposed for 0.08 sec. with a tachistoscope. The observers were six college students. The quantitative results are, in general, those of other investigators in this field. The average limit of the range of attention is between 4 and 5 impressions: there are but slight individual differences: the longer series admit of a somewhat higher average performance, particularly when grouping can be employed: practise has but a very slight effect, which is easily explicable in terms of habituation to the experimental conditions and of development of the 'trick' of grouping. Range of attention, itself, is, so far as one can see, not affected by practise.

In the second set of experiments (range of apprehension), groups of dots, pictures, drawings, nonsense syllables, and stanzas of poetry were exposed for 3 sec. with the tachistoscope, and collocations of 10 objects were exposed without instrumental aid for 6 sec. The observers were three adults. With nonsense material, the range was but slightly

[1]A brief account of these experiments was presented at the meeting of Section L of the American Association for the Advancement of Science, at Chicago, 1907, and a summary appeared in *Science*, 27: 1908, 526. It was the author's intention to withhold publication until the tests could be repeated with school children. As circumstances have conspired to render this impossible, the results are now published with the hope that other investigators may undertake similar tests with children.

greater than with the short exposures: with sense of material, the range was increased on account of the possibility of more effective assimilation and grouping. Individual differences are so striking and so specific as to negative the notion of a general ability to apprehend, or even of a general ability to apprehend visually. The effect of practise, as before, is negligible when adaptation and assimilative devices are eliminated. A qualitative analysis shows that performance is conditioned by numerous factors, of which the most important are: native capacity, degree of attention, specific capacity for given types of material, ease of assimilation of the material shown, 'obstruction' or distraction, ideational type, voluntary restriction of observation, and grouping

PURPOSE OF THE OBSERVATION.

In 1896, Miss Catherine Aiken published an account of certain exercises, which she conducted with her pupils at a private school for girls at Stamford, Connecticut, for the purpose of mental training, particularly of training in the concentration of attention.[2] The results cited in this book are so extraordinary as to challenge attention both from psychologists and educators, for if it be possible, by devoting ten or fifteen minutes daily to simple exercises, to accomplish the results which are claimed,[3] it would appear to be incumbent upon all teachers to institute such exercises and to regard them as a very essential part of schoolroom training. If, on the other hand, Miss Aiken's results cannot be duplicated,

[2] CATHERINE AIKEN, *Method of mind-training: concentrated attention and memory.* New York, 1896. Pp. 107. For supplementary exercises, see her *Exercises in mind-training.* New York. 1899. Pp. 121.

[3] A single example, drawn at random, will suffice. There were placed upon a revolving blackboard in vertical column, the following numbers: 230, 729, 11, 36, 40000, 16, 40. By rotating the board, these were exposed for 3 seconds only; the pupils were then asked but once to multiply the first number by 2, to extract the cube root of the second, to square the third, to extract the square root of the fourth, to divide the fifth by 2, to multiply the sixth by 24, and to divide the seventh by 4, and then to repeat the changed column, which they did as follows: 460, 9, 121, 6, 20000, 384, 10 (pp. 30-31).

From correspondence with some of Miss Aiken's pupils, I infer that it was her class as a whole, and not any single pupil, that was able to accomplish such a feat. Even so, the performance is amazing.

it is equally important to establish this fact and then, if possible, to find out the cause of the discrepancy.

The experiments which follow were undertaken, therefore, with the intent to carry out, under laboratory conditions, exercises like those used by Miss Aiken and to measure the extent, and to analyze the nature, of the improvement that appeared. It may be admitted at the outset that the negative outcome of these experiments is not entirely conclusive; it may be objected that practise was not sufficiently long; it may be objected that our observers were adults, and that the outcome would have been essentially modified had our tests been applied to children. But neither of these objections seems to us of great moment; we feel that our observers had reached their maximal efficiency, and we are unable to believe that children could be brought to exhibit a range of apprehension so markedly superior to that of competent and well-trained university students and instructors.

Our experiments fall naturally into two groups: (1) Tests with tachistoscope exposures, so brief as to preclude eye-movement or the roving of attention, and (2) tests with exposure of more complex objects for periods of 3, or of 6 sec. The first set of experiments will be considered as tests of the range of attention, the second as tests of the range of apprehension. In both cases, the essential problem was to ascertain the effect of practise upon a small number of college students and adults.

PART I. THE RANGE OF ATTENTION.

APPARATUS.—All the short-exposure tests were conducted by means of a disc-tachistoscope[4] (Fig. 1). This consists essentially of a cardboard disc, 56 cm. in diameter, in which

[4]For a fuller description of this instrument, together with a discussion of the problems of tachistoscopy, see the writer's *Manual of Mental and Physical Tests*, Baltimore, 1910. The instrument is sold by C. H. Stoelting Co., 121 N. Green St., Chicago, Ill.

an adjustable sector has been arranged to expose, as the disc revolves, the stimulus-card placed just behind it. This disc is mounted upon one end of a horizontal axle. A meter-stick, equipped with two adjustable weights, is attached to the other end of the axle. By suitable adjustment of the weights, the disc can be rotated at the speed desired. Just

Fig. 1. DISC TACHISTOSCOPE.

before an exposure, the stick is supported upon a release-lever at the back of the instrument. In this position, the stimulus-card (9 x 9 cm., bearing one-half inch black letters) is hidden directly behind a fixation-card, but the fixation-card is visible through a square opening in the large cardboard screen that covers the front of the whole instrument, and through another square opening in the rotating

disc. When the release is pulled, the disc travels downward, the fixation-card is automatically lifted out of the way, and the notched sector of the disc exposes the stimulus-card for about 0.08 sec. The stimulus-card is illuminated from one side by a 16 C.P. frosted, tubular electric lamp. The observer's position is maintained by a headrest, as the cut illustrates.

The material used for these short exposures consisted in the main of 5, 6, and 7-place nonsense combinations of letters, *e. g.*, HFQSL, KTCMKZ, LSCLGYN.

METHOD.—Six college students, only two of whom had had training in psychological observation, served as observers. With two of these, the experiment was not carried far enough to warrant inference concerning practise, though their work, so far as it went, corroborated that of the four that are here mentioned. With these latter, tests were continued until it was evident that maximal practise had been attained. From 124 to 250 and more exposures were given to each observer. Five, six, and seven-place cards were given in irregular order, though the first trials were mainly confined to the shorter, and the final trials to the longer series. Introspective observations were recorded, but they were scanty and tended to become stereotyped. A warning "ready" signal was, of course, given about 1.5 sec. before each exposure.

The scoring was done by the simple method of crediting one unit for each letter correctly observed, and then deducting 0.5 for each error of transposition or insertion, *e. g.*, BVXTN or BXVTIN for BXVTN was scored 4.50.

RESULTS.—(1) As Table 1 shows, the *average number of letters* that can be grasped in a single exposure lies between 4 and 5 (4.82)—a result in close accord with previous tachistoscopic work.

(2) There are only slight *individual differences* in the work of different individuals.

TABLE I.

Average Scores in the Exposure of Isolated Letters.

Obs.	Number	5-Place Series	6-Place Series	7-Place Series	General Average
B.	124	4.85	5.09	5.25	5.06
E.	177	4.84	4.49	4.48	4.53
N.	249	4.74	4.92	5.38	4.97
T.	124	4.51	4.86	4.40	4.71
	674	4.74	4.84	4.88	4.82

(3) *Comparison of the series* shows that the 7-place series are somewhat more favorable than the 6-place, and these somewhat more favorable than the 5-place series in average scores. This is not, of course, because the longer series are easier, but because they offer opportunities for occasional scores of 6 or 7. This advantage slightly overweighs the disadvantage of greater complexity.

(4) The instances just cited in which 6 or 7 letters are reported correctly are almost invariably instances in which the presence of vowels permitted the *formation of syllables, e. g.,* WAEGZME, KMDEMBH, etc.; in other words, these high scores are due to mental grouping of the elements exposed.

(5) Observers frequently assert that more has been seen than can be reported a moment later. That constituent elements of the stimulus may make an impression, and yet not a sufficiently strong impression to be named an instant later, is entirely probable; in fact, it can be demonstrated by asking the observed whether a given letter was exposed or not. It is possible that practise may augment the observer's capacity to hold these more fleeting and transient impressions, but we have no direct evidence to offer on this point.

(6) The *effect of practise* is indicated by the summarized data of Table 2, examination of which will suffice to convince the reader that attentive and effortful observation

through a series of from one to two hundred or more exposures has a curiously small effect upon the range of attention.

TABLE II.[5]

Effect of Practise in the Exposure of Isolated Letters.

	5-Place Series			6-Place Series				7-Place Series		
Observer.....	B.	N.	T.	B.	E.	N.	T.	E.	N.	T.
First Period..	4.87	4.44	4.50	5.03	4.75	4.38	4.73	4.25	4.90	3.83
Middle Period	——	4.87	——	——	——	4.85	——	4.02	5.54	——
Last Period...	4.78	4.77	4.50	5.25	5.08	5.06	5.08	4.90	5.40	5.80

This small effect is easily explained. It is due almost entirely to two factors; first, to habituation to the experimental conditions; second, to the development of a device of forming groups of the letters and of using these groups, however arbitrary or inexact they might be, as bases for report. Habituation takes place quite rapidly in these experiments; a marked improvement is observable in the first sitting Combination or grouping appears more clearly in the 6 and 7-place series, probably because these series afford more opportunities for its exercise. If these two factors were eliminated, the practise-effect would be negligible, if not altogether absent. In other words, adult observers very quickly reach a physiological limit of visual observation when the exposure is so restricted as to prohibit eye-movement and roving of attention.

PART II. THE RANGE OF APPREHENSION.[6]

1. Three seconds' exposure with the tachistoscope.

Apparatus.—The same tachistoscope was employed, but

[5]In explanation, it may be said that observers *B*, *E* and *T* had less than 200 exposures, so that, to eliminate fluctuations due to chance variations in the material, their work is divided into two periods: observer *N* gave a longer time to the work and it is instructive to divide his performance into three periods. In his case, the number of exposures represented is 249: over 300 were actually made, but the results of two sittings were unfortunately destroyed. Our notes taken at the time show, however, that the general results would not have been affected had these figures been included.

[6]A series of preliminary tests was conducted with the observers of Part I., using complex visual material, drawings, lines of poetry, columns of figures,

the fixation-card was removed; the device for holding the stimulus-card was replaced by a larger one suited for sheets of stiff paper, 5 x 8 inches; the weights and sector were adjusted for an exposure of 3 sec.

The material exposed was of five kinds: (*a*) dots, (*b*) pictures, (*c*) nonsense syllables, (*d*) drawings, (*e*) stanzas of poetry.

The dots were irregularly arranged groups of asterisks, numbering 6 to 20, placed by a typewriter within a space 35 mm. square in the center of the sheets of paper. The pictures consisted of drawings, cuts, lithographs, etc., cut from magazines, and they occupied, frequently, the full space of the blank, *i. e.*, 5 x 8 inches. The nonsense syllables, printed in a single horizontal row with a typewriter, were 8 to 10 in number, each being composed of 3 letters. The drawings, which were made with pen and ink, were for the most part meaningless combinations of lines or symbols, though a few gave some hint of meaning. The poetry, also typewritten, consisted of four line stanzas from Keats' *Isabella*.

METHOD.—The form of material to be shown was stated, and exposure for 3 sec. was made when the observer was thoroughly prepared, by fixation and attention, to receive it.

In reporting his observation, the observer made a rough pencil sketch of the dots, drawings, and often of the pictures, though these last were commonly described orally. He wrote or recited, at his will, the nonsense syllables and the poetry. The report was supplemented, as a rule, by a "quiz" on the part of the experimenter to determine whether details not reported had escaped observation, or had merely been neglected in the report. In the case of the pictures and drawings, the experimenter usually also confronted the observer with the card and asked him what details he had failed to note, what he had forgotten, or what he had misapprehended.

The performance of the observers was scored in the following manner: with the dot-cards, any mistake, even by one

etc., exposed without the aid of apparatus. These tests gave valuable hints for the arrangement of the final experiments, and threw light upon the mental processes concerned, but as they were not pushed far enough with any observer to warrant reliable inference as to the effect of practise, they will not be discussed further in this paper.

number, was considered as a failure; with the pictures and the drawings, the report was graded upon a scale of 10 points (for an adequate or complete report); with the nonsense syllables, one unit was credited for each letter correctly reported, but 0.5 was deducted for an error of transposition or insertion, whether of letters within syllables or of the syllables themselves; with poetry, the same method was followed, substituting words for letters.

OBSERVERS.—In these apprehension tests, the observers were Dr. H. A. Ruger, Professor of psychology at Colorado Springs College; Dr. L. A. Geissler, instructor in psychology at Cornell University, and Miss Helen Vermilyea, a school teacher with a small amount of psychological training.

2. Six seconds' exposure without the tachistoscope.

MATERIAL AND METHOD.—A small table was covered with a full-sized sheet of gray cardboard. Upon this as a background was placed a group of 10 objects (*e. g.*, pencil, spoon, tin box, leaf, key, postcard, pipe, wooden cube, pebble, watch), with the precaution to avoid combinations of obviously related objects, such as a pen and an ink-stand. Ten different objects were used for each test. A gray cloth covered the objects while the observer was taking his position. For the exposure, he stood directly in front of the table, and held a small sheet of cardboard before his eyes. A noiseless seconds' pendulum, off at one side, served the experimenter as a time-control, and he himself, after removing the cloth, took the observer's cardboard screen and, after a warning "ready," made the exposure by removing the screen for six seconds. The replacement of the screen terminated the exposure: the observer wheeled about, to turn his back to the table, and then immediately described (usually, also, sketched roughly) the objects on the table. Stress was laid primarily upon naming as many objects as possible, secondarily upon describing their details and their spatial relations.

One unit was credited upon the observer's score for each object correctly named.

These tests were made upon the same three observers just mentioned and were interspersed with the 3-sec. exposures. The experiments as a whole occupied some six weeks time.

RESULTS FOR BOTH TESTS OF APPREHENSION.—(1) The most striking quantitative result of these tests is the very small increase for certain kinds of material, in the number of items observed with the exposures of 3 and 6 sec. as compared with the exposures of 0.08 sec. (range of attention tests). Thus, for instance, with an exposure of 6 sec., the average number of objects named was 6.03, while, with an exposure only 1-75 as long, between 4 and 5 objects could be named. Similarly, only 3 to 4 nonsense syllables (10.15 letters) could be read correctly in 3 sec. On the other hand, the longer exposures materially increase the range of perception of sense-material which admits of quick assimilation: nearly 12 words were read in poetry as against the 4 to 6 limit in ordinary tachistoscopy. The advantage in this material is evidently due to the same factor discerned in the exceptional results with isolated letters, viz: grouping and combination into meaningful units.[7]

(2) *Individual differences* in quick apprehension are clearly indicated in Table 3. Thus, *V* excels in the estimation of dots and in reading poetry, but is the poorest of the observers in reading nonsense syllables, in reproducing drawings, or in describing pictures and objects. *G* excels in these last performances, but is inferior in reading poetry and in estimating dots.

These facts are important in connection with our study of the effect of practise, because they negative the idea of general ability in apprehension, or even of general ability in

[7] In the case of poetry, our observers felt that the limit of their performance was set simply by the amount that could be read during the exposure, whereas, even in the 6 sec. exposures, there is not time enough clearly to apprehend 10 disparate objects. The maximal correct reproduction of poetry was that of *R*, who, in 3 sec., read the first 19 words of the following:

"Were they unhappy then? It cannot be.
Too many tears for lovers have been shed,
Too many sighs give we to them in fee,
Too much of pity after they are dead."

visual apprehension: we may state only that a given individual excels in the attentive observation of pictures, of drawings,

TABLE III.

Individual Differences in Visual Apprehension.

	Dots	Pictures	Nonsense Syllables	Drawings	Poetry	Objects
G	33	6.96	10.9	8.65	9.42	7.10
R	46	6.89	10.7	6.42	12.92	5.57
V	80	4.40	8.9	3.70	13.21	5.50

NOTE.—The scoring is as follows: For dots, the percentage of exposures in which the dots were correctly counted. For pictures and for drawings, the average merit, as estimated on a score of 10. For nonsense syllables, the average number of letters, and for poetry, the average number of words correctly reproduced. For objects, the average number correctly described.

of words, or of certain kinds of objects, etc., not that he excels in all-around observation. Thus, *V*, it will be seen, is more than twice as efficient as *G* in the perception of groups of dots, but *G* is more than twice as efficient as *V* in the perception of drawings. These considerations make it still more improbable that a series of classroom exercises, like Miss Aiken's, will train and develop general capacity to attend.

(3) The *effect of practise* is shown in Table 4. Here, each period represents the average of three exposures, usually one daily for three days. Inspection of these data gives little warrant for the belief that systematic practise would enable an adult markedly to improve his ability for quick visual perception.

TABLE IV.

Effect of Practise upon Visual Apprehension.
Averages for Three Observers.

Period.....	1	2	3	4	5	6	7	8	9
Pictures.....	6.6	4.9	5.9	6.3	6.9	6.9	6.5	5.5	
Nonsense.....	9.3	10.6	8.4	10 8	11.7	10.6	10.4	8.9	9.2
Drawings.....	6.6	6.3	5.0	5.6	5.0	7.7	6.5	6.6	5.7
Poetry.....	10.7	11.5	11.3	10.8	13.0	12.5	13.0	11.7	
Objects.....	5.6	6.3	5.9	6.0	5.9	6.5	6.4		

The tests with dots do not lend themselves readily to quantitative treatment. The seeming improvement with drawings during the sixth period was due to the use of one very easy drawing in that group. There is evidence of a slight improvement in reading poetry (amounting roughly to an increase of one word), but this may be attributed to increased familiarity with the peculiar style of the poem in use. If any improvement can be inferred in the case of the objects-test, it must amount to an increase, on the average, of less than one object correctly reported.

Just as in the short-exposure experiments, the slight practise-effect which can be discerned here is entirely explicable in terms of habituation to the experimental conditions, and of the development of grouping schemes or other devices of observation to be mentioned below. It is highly improbable that this period of practise trained the attention of our observers in such a manner as to enable them to surpass others in the quick observation of objects or incidents other than those used in the experiments.

(4) A *qualitative analysis* of the data secured in this experiment shows that the efficiency in visual apprehension exhibited by any individual is conditioned upon the following factors:

(*a*) *Native capacity* for concentrating attention in general. This factor we believe to have been unaffected by practise.

(*b*) The *degree of attention* given at the exposure. In theory, each exposure is accompanied by maximal attention: in practise, this condition is not always secured, and when it is not, the range is reduced.

(*c*) The *type of material* in use,—drawings, nonsense syllables, etc.,—has an effect upon the performance, and this effect varies in individual observers.

(*d*) *The ease of assimilation* of the particular stimulus in use obviously conditions performance: thus, an easy bit of poetry will increase the range of all observers; a drawing that

can be *named,* however fancifully, can on this account be held longer and reproduced better by most observers.

(*e*) *Obstruction or distraction.* Some detail in the object displayed, whether important or trivial, will often catch the observer's attention, interfere with his exploitation of the rest of the exposure-field, and thus measurably reduce his performance. For instance, a misprint in a line of poetry, or the presence of some unusual word, will induce most observers to reread the line, even at the obvious expense of their record.

(*f*) *Ideational type.* Visually minded observers hold drawings, pictures, and objects by their visual appearance, and are inclined to use visualization for the reproduction of at least portions of the nonsense material and poetry. Auditory-minded observers hold verbal material by auditory imagery: if decidedly auditory-minded, like the writer, they may also attempt to hold even pictures, drawings, and objects in auditory terms, by using verbal formulations as cues for recall.

(*g*) *Restriction.* Observers often intentionally restrict their range. Thus, in the exposure of nonsense syllables, it was early discovered by all the observers that, although by an effort, all ten of the syllables might be read over, only a poor reproduction (two or three at most) would result; if, however, attention were confined to the first four syllables, these could be read over twice and reproduced with some chance of accuracy. There may have been a similar intentional restriction of the range of apprehension to other types of material.

(*h*) *Grouping.* As noted above, apprehension is greatly facilitated by any scheme that permits of grouping the constituent elements in the field. The development of these grouping schemes is perhaps the most important single factor in practise-improvement, at least after the habituation of the preliminary trials. Thus, in the dot-tests, the collocation of irregularly arranged dots was by most observers, arbitrarily rearranged (subjectively) into two, three or sometimes four

groups of dots,—each group containing three to six dots. In a similar manner drawings were frequently split up into component elements and then recombined by a sort of analysis and synthesis. In auditory-minded observers, this process is usually accompanied by the application of verbal symbols as tags for recall, *e. g.*, "a rectangle, two peaks, and an arrow." This analytic-grouping is commonly found to be more effective than the "steady stare" or "impression-of-the whole" method which observers are prone to use at first.

Professor E. L. Thorndike, of Teachers College, Columbia University, recently delivered at the University of Illinois a series of five lectures on "Individual Differences and Their Causes." The lectures discussed "Measurements of Individual Differences," "The Influence of Sex," "The Influence of Race," "The Influence of Immediate Ancestry," "The Influence of Training."

Dr. Clouston, Edinburgh, addressing a meeting of the Dundee Child Study Society, said he believed that, if they could find a way of improving the self-control of the coming generation, they would do more good than the House of Commons does in fifty years, and he believed it was a quality that could be improved if they went about it the right way. With the aid of school medical inspectors the teachers would now be able to apply general rules in specific ways, as at present it was one of the difficulties of the teaching profession that general rules of education could not apply to large groups of children. The ideal kind of education would be to sort out the children on certain natural rules, and subject each group to the kind of education and environment that suited its particular brain cell qualities. While that was still in the region of the ideal, teachers were at present endeavoring to individualize their children, and apply the rules of education to the individual instead of to the class in bulk.—*Educational Times.*

THE COLLEGE LAGGARD.*

J. B. MINER.

University of Minnesota.

SUMMARY.

A group of 127 delinquent college freshmen were studied statistically and by a questionnaire sent to them and to their high school principals. An excess of laggards is found among the men as compared with the women and among the fraternity as compared with the non-fraternity men. The personality of the student plays a more important role in scholarship than does the college environment. Moral traits, such as resistance to social and other distractions, seem more important than intellectual incapacity in explaining failure.

It is with the hope of stimulating interest in the topic of laggardism in college rather than with the idea of solving its problems that I am reporting in this paper a brief study of a group of 127 delinquents in the academic college at the University of Minnesota. Since this is a comparatively new field of investigation and the study has been mainly local, the results are suggestive rather than conclusive and the opinions decidedly tentative. From the point of view of this paper the important thing is to call attention to the college sphere as an inviting field in which to study the hopeful type of mental retardation. There is one manifest advantage in studying the college laggard. He is sufficiently intelligent and mature for his own introspections to be valid testimony.

The group which I studied was selected by a rule of the faculty which says that any student who receives conditions or failures in 60 per cent. of his work the first semester shall

*Read before the North Central branch of the Psychological Association, November 27, 1909.

not be allowed to register for the second semester. During the past three years under this rule 127 freshmen would have been barred. This is a little less than 9 per cent. of the entire group of 1454 freshmen. In this larger group, I have compared the men and women, the fraternity and non-fraternity students, and the graduates of public and private schools to see what proportion reach the laggard list. I have also attempted to inquire more specifically about certain factors which might influence scholarship, by sending a questionnaire to the laggard students themselves and to the principals or superintendents under whom they graduated from high school. As might be expected this questionnaire met with a sorry fate among the ex-students, only about one in six replying to it. This shows conclusively that the views of the students themselves cannot be reached by the questionnaire method. The replies of 29 superintendents, about half of those written to, when taken together with the students' letters, gave me hints on at least 91 of the laggard group. I shall take up first the statistical inquiry.

The condition at Minnesota for studying sex differences is unusually favorable. During the last three years in the freshmen classes the sexes were about even in number, 627 men to 827 women. The men and women take about the same courses and recite to the same instructors. In comparing the probability of reaching the delinquent list, I find that the fraternity influence is such an important factor that the comparison can better be made between the groups of men and women who are not members of fraternities. Of the group of 482 non-fraternity men, 10.4 per cent. were on the laggard list, as compared with 6.2 per cent. of the group of 675 non-fraternity women. As a check on this method of comparing the sexes I have figured the percentages of delinquent hours of work for the non-fraternity groups in the freshman class for the first semester of the year 1907-8. Here again the men show at a decided disadvantage although not so much as when comparing the laggard lists. The percentages of delinquent hours are as 18.7 to 14.6. Roughly

then we might say that the chances of the first-year men not passing in their work were about 28 per cent. greater than for the women, and of their leaving college for delinquency 68 per cent. greater. There would, of course, be considerable variation in these percentages from year to year. Slosson has published* the percentages suspended for delinquent scholarship from Stanford University for last year. Comparing the non-fraternity men and women for all classes who live under similar conditions in the college halls at Stanford, we find an even greater relative preponderance of men. The percentages are as 12.5 to 3.6.†

That this difference between the sexes is due to the instructors having favored the women in their grading does not seem to me to be likely. If this tendency to grade women higher were noticeable, we should expect it to be shown more prominently in letting women pass than in giving them the high marks when they do pass. The opposite is true so far as can be judged from the grades at Minnesota for one semester. The women were favored, if that interpretation were allowed, only two-thirds as much in escaping failure or condition as in obtaining the two highest grades, (the grades "excellent" and "good").

The excess of the laggards among the men accords with what has been found by Ayers in the elementary schools. He states from a comparison of the records of 14 or 15 cities that "there is 13 per cent. more retardation among boys than among girls and that there are 13 per cent, more repeaters among boys than among girls." This, with the fact of greater elimination of boys in the grades and high schools, leads Ayers to conclude that "our schools as they now exist

*The Independent, April 1, 1909.

†At Chicago University Slosson found that from 1904 to 1908 in the Junior College 13.6 per cent of the men failed and 5.8 per cent of the women; 19.2 per cent of the men were conditioned and 11.2 per cent of the women. In 1906 43 per cent of all women and 19 per cent of all men received honorable mention on graduation; 20 per cent of the women and 9 per cent of the men received honors for special excellence in particular departments of the Senior College. Independent, Jan. 6, 1910, p. 33.

are better fitted to the needs and natures of the girl than of the boy pupils.'"* I am inclined to think that a similar reason accounts in part for the poorer showing of men in college. The work seems to them ill adapted to their future needs. The men, therefore, find college work less interesting than do women, they have less motive for studying, less desire to make good in that environment.

There may, however, be a native difference between men and women which is expressed in the hypothesis that the male type is more variable. If, then, we had a chance group, we should expect relatively more men to fail and to excel in any environment. Expressing this hypothesis as a mental trait, I suppose we might say that women may be more conservative, hence more conscientious in their work. If the sex difference in laggardism is due to variability, we should find relatively more men also at the other extreme in scholarships, unless some selective factor had disturbed the group. So far as the freshman grades for one semester are concerned, the men in the non-fraternity group show only about three-fourths the chance of the women of getting the two highest grades. I know of no high school data for testing how much selection disturbs the comparison of the sexes in college, but I suspect that the scholastically backward girl in high school is not so likely as the backward boy to go to college. It would also seem likely that outside inducements, such as business, would draw away the bright boy on graduation from high school rather than the bright girl. Until we have more information on these points we cannot conclude that the excessive failures of boys in college is due mainly to the poorer adaptation of the college to their needs.

Fraternity life is perhaps the most important outside influence on scholarship which can be inquired into statistically. Of 145 fraternity men in the freshman class at Minnesota during the past three years, 20 per cent. were on the laggard

*L. P. Ayres, Laggards in Our Schools, New York: Charities Publication Committee, 1909, p. 158.

list. Of 152 sorority girls, only 3.3 per cent. were on this list. This indicates about twice as bad a condition among fraternity as among non-fraternity men and only a little more than half as bad a condition among fraternity as non-fraternity women. The favorable record of the sororities is almost entirely explained by selection since for two of these years all but one sorority waited until the second semester to initiate new members. The tabulated records for all the marks for one semester indicate similar conditions.* There were relatively more delinquent hours among fraternity than non-fraternity men in the proportion of 30.3 to 18.7 and less among the women in the proportion of 7.9 to 14.6. In contrast with these differences, both the fraternity men and women seem to get about the same percentage of the two highest grades as do their non-fraternity competitors.

Whether the record of the fraternity men at Minnesota is typical I am not quite sure. At the University of Nebraska it is certainly quite different. The registrar informs me that at the mid-semester examinations last year there was a smaller proportion of delinquent hours among fraternity than among non-fraternity men, the ratio being as 13 to 22 per cent. On the other hand, at Stanford University the condition resembles that at Minnesota. According to Slosson, for the last ten years "in round numbers about half of the men who have been suspended belonged to fraternities, although they have numbered about a quarter of the masculine student body." The delinquency records of the sorority and non-sorority women for one year at Stanford show no marked difference. So far as Minnesota is

*Hours work for the first semester, 1907-8.

Non-fraternity men, total hours, 2730; delinquent, 18.7 per cent.; excellent and good, 42.8.

Fraternity men, total hours, 577; delinquent 30.3 per cent.; excellent and good, 41.3 per cent.

Non-fraternity women, total hours, 3076; delinquent, 14.6 per cent.; excellent and good, 57.6 per cent.

Fraternity women, total hours, 647; delinquent, 7.9 per cent.; excellent and good, 53.5 per cent.

concerned the condition among the sororities has been accounted for by their greater care in selecting members, while the bad record of the men's fraternities is more likely due to the distracting influence of fraternity life than to the election of poorer students to these societies.*

In the minds of high school authorities social and fraternity distractions are apparently the most serious environmental influence on scholarship in college. Among fifteen possible influences specifically considered and checked over by them in replying to the questionaire, these two were most frequently referred to when accounting for the failure of particular graduates from their schools. If we count as one-half those cases where the factor was regarded as a secondary influence, and they were asked to check in this way, I find that among the 72 students for whom the questions were gone over there were 30 cases in which too much society was checked and 18½ in which fraternity life was checked. While the number of cases is small, I believe that it is significant that these influences were the most frequently mentioned among the long list of environmental factors inquired about.

The importance of outside distractions is probably also indicated by what might be called the handicap of wealth. The evidence for this is not at all conclusive, but several straws seem to point in the same direction. The Minneapolis high school which had a noticeably worse record than the others is in the wealthiest district in the city; the answers to the questionaire gave "superabundance of spending money" as sixth among the environmental influences of failure; the percentage of students from private schools who get on the laggard list is about twice as great as from the public schools, it is as 15 to 8 per cent. Among 50 students on the laggard list, about whom I was able to obtain the in-

*At Yale Slosson notes that 13.6 per cent of the members of the senior societies were elected to the honorary scholarship society, Phi Beta Kappa, as compared with 24.2 per cent of the other students. Independent, Feb. 4, 1909, p. 251.

formation, 39 were from families which needed to make no sacrifice to send their children to college. This proportion of four-fifths is, I am convinced, considerably larger than in the class as a whole.

If we try to distinguish the relative importance of personal and environmental factors as causes of failure in the college, one fact stands out prominently. Of 78 students on the laggard list about whom I received reports from the superintendents or principals, 47, or practically two-thirds, would not have been certified to the university for admission on the basis of their high school records if our new requirement had been in effect. This rule provides that in order to be admitted to college without examinations the students must have obtained a record in all subjects offered for entrance of at least 75 per cent., providing the passing mark was 65, or of 80 per cent. if the passing mark was 75. This means that two-thirds of those who became serious college laggards finished high school by a very narrow margin, they were already laggards in their high school environments, at least they were so backward in their studies that the principals have agreed hereafter not to recommend that class of students for admission to the university. Comparing this with Dearborn's results we find how surely personal characteristics affecting scholarship are established by the time of graduation from high school. Dearborn has shown that in a group of 472 students of the University of Wisconsin the Pearson coefficient of correlation of the standings in high school and the freshman year in college was +.80.*

This evidence that personality rather than college environment is the main reason for failure brings us to the crux of the problem of college laggardism so far as psychology is concerned. What personal characteristics are most prominent in determining college failure? I feel justified in submitting only one distinction for your consideration. Are

*W. F. Dearborn, The Relative Standing of Pupils in the High School and in the University, Bull. of Univ. of Wis.

they primarily intellectual or moral characteristics? If we take as intellectual functions the capacity to observe, to memorize, to imagine, and to reason, and as moral characteristics the organization and control of the emotions, desires, and impulses, one might expect that the college would have to do primarily with the former and would reject mainly those who are primarily dull. From the study of this laggard list I can find very little to justify such a conclusion and some reason to believe that where one lacks in intellect four are incapacitated by bad habits of control and disorganized characters. To begin with, I have at least 27 instances which indicate that the student has passed high school work creditably or showed reversal of form after leaving Minnesota. Here then are about a third of the 78 cases heard from in which it would be rather absurd to suppose intellectual incapacity.

Some of these letters are decidedly interesting. There are two laggards with a high school average of 90 per cent. Of one of these the principal says he was "an excellent student at all times." Another principal says of one of the laggards, she "did fine work while here." Another, in the opinion of the principal, had "a fine intellect." Of one it is said, "her record was very good with us." Another was said to be the best debater in the Twin City high schools. His principal writes of him, "He was as strong a student as we ever turned out, greatly interested in debate. . . . He has entered a school in Colorado and has the highest scholarship in his school." Another, whose parents are well able to pay his expenses, writes, "I am paying my own expenses at the University of Wisconsin and seem to be doing much better work." Here is another of whom the principal says, "His class work in all subjects was 85 per cent. or more. . . . He was a bright and a good student. . . . He has made good in the college which he entered the next year." Another when at high school was said to be "an inventive genius. He was devoted to wireless telegraphy and constructed the stations at the high school. He had the keenest analytic mind, did

all of his work in high school well, but needed constant advice, one of the finest boys we have had.'' While the others of the 27 have not as good high school records as these, they at least had creditable records.

In looking over the replies to the questionnaire with the point in mind of judging the importance of intellectual and moral incapacity I find that there are 86 students on the laggard list about whom it is possible to estimate on the basis of the opinion of themselves or their high school officers. My impression from these letters is that the cause of failure in 14 cases might be assigned to influences extrinsic to this problem such as health and necessary outside work; in 15 cases to intellectual incapacity, and in 57 to moral reasons such as lack of purpose, laziness, and inability to resist social, fraternity and other temptations which interfered with work. In other words, four times as many failures seemed to be referable to moral as intellectual factors. Doubtful cases I never classed in the moral group. At best this is only an attempt to tabulate opinions and for only a small group of people, but it is an impression gained from reading a rather unusual collection of letters which had been gathered before the idea of testing this point was conceived. In rather aimless wandering we sometimes hit upon striking facts which might escape us if our attention were fixed upon a definite goal. If this is such a fact it may have important implications for the training of laggards not only in college but in the high school and grades. We are at least coming to learn, as Ayers states, that ''the long yearned-for royal road to learning is not always to be found through the surgeon's knife.'' I should like to suggest that the supplementary teacher in elementary and secondary schools or the college advisor probably has a much bigger problem than teaching the laggard his lesson. It is the problem of developing habits of application, habits of resistance to the distracting temptations of other activities. It is the general problem of interest and control. This, rather than physical defects or intellectual incapacity, may prove the main problem of scholastic retardation.

THE QUALITIES OF MERIT IN TEACHERS

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The investigation that is summarized by this paper may be described as a preliminary inductive inquiry of a statistical nature into the qualities of merit in teachers. The word "preliminary" we use intentionally. The topic of the qualities of merit in teachers is so large and has been so little investigated (albeit frequently discussed) that a brief study like the present can do little more than to make a beginning and to raise questions.

Among the questions that arise upon investigating this topic are: What are the fundamental qualities of merit in teachers that should receive scientific and administrative recognition? How should, or might, a list of these qualities be accurately determined? What is the relative importance of these qualities, i. e., how should they be weighted in ranking teachers? How do these qualities correlate among themselves? How do they differ in elementary, high school and college teachers? To what uses might an accurate system of ranking teachers be put? How should the problem in hand be investigated, i. e., how should data of scientific value be obtained? To what extent do supervisory and administrative officers now explicitly rank their teachers on the basis of merit? What separate items of merit do they recognize? What practical use do they make of their rankings?

The study in hand aims to touch upon only a few of these questions and it does not pretend to exhaust any of them.

We decided, somewhat arbitrarily, to secure the following fourteen items of data from a number of representative schools.

1. The teachers by grades, numbered consecutively.
2. The highest certificate, diploma, or degree held by each teacher.
3. Experience in years.
4. General teaching merit.
5. Health.
6. Personal appearance.
7. Initiative or originality.
8. Strength of personality.
9. Teaching skill; method.
10. Control or ability to keep order.
11. Ability to carry out suggestions.
12. Accord between teacher and pupil.
13. Progressive scholarship or studiousness.
14. Social factor outside of school.

Beginning with the fourth item, the item of general merit, the instruction was given to rank the teachers by number in their order of merit, placing the best teacher first, the next best second, and so on through the list. It was explicitly stated not to assign grades anywhere, but to give relative position only. As the typical ward school contains only from eight to twelve teachers, we thought that this could be done quite readily. Cases of doubt we asked to be marked with a "D," but only a few collaborators took advantage of this.

The fourteen items mentioned, together with the necessary instructions, and explanations, we had mimeographed on paper of letter size. We placed each item at the head of a column and spread the items over two sheets, but this left ample room for the data requested. There was room for 25 names or numbers in each column without crowding.

The blanks thus prepared we submitted to the principals and supervisors of our acquaintance with the request that the data called for be furnished us. These officials responded with a fair degree of generosity and we are indeed appre-

ciative of their assistance. They gave us in all 39 returns. Of these 39, we have used 26 in preparing this report. Four of the other 13 were improperly filled out, four others came from high schools, and five contained less than five teachers, which was the smallest number that we thought it safe to include.

The data collected obviously admit of a large number of correlations. The different items in each return can not only be correlated with general merit, but also with each other, and as there are 12 correlatable items in each return, this permits of 66 separate correlations for each blank, or 1716 in all. While it might be worth while to make all these correlations, we made only 15 per sheet, or a total of about 390.

The correlations that we have made we have calculated by means of Woodworth's per cent. of displacement. This method is rapid and requires only the relative positions of the units in the items compared. It notes the amount of displacement or agreement between the two orders. The possible results vary from 0% to 100%. Two orders that are alike give a 0% of displacement, or perfect correlation, while two orders that are the reverse of each other give 100% of displacement, or complete antagonism. Fifty percent. of displacement would mean no correlation, while the percents from zero to fifty indicate decreasing amounts of correlation, and those from fifty to one hundred, increasing amounts of antagonism.*

We have worked out a complete set of correlations with all the other items for general merit only, but we have also compared originality and the ability to carry out suggestions, and the strength of personality and accord, through all the papers, and we have made many other isolated correlations for sampling purposes.

The results of these correlations are condensed in the following table. This table gives the number of cases compared

*For a fuller account of this method of calculating coefficients of correlation, see Ruediger, *The Field of Distinct Vision*, Science Presss, N. Y., pp. 37-39.

for each item, the range of the percents of displacement, the median percent of displacement, the average percent of displacement, and the M. V. and the P. E. calculated from the average. The last column gives the figure obtained by transmuting the average percent of displacement into the Pearson coefficient.

General Merit and	No. of Cases	Range	Med.	Av.	M. V.	P. E.	Pearson
3. Experience ...	25	10–60	29	32	11	8	36
5. Health	18	6–67	50	48	10	7	4
6. Appearance...	24	10–61	44	40	10	7	20
7. Initiative.....	26	4–53	25	25	11	8	50
8. Personality....	26	0–70	25	27	13	11	46
9. Teaching Skill	26	0–70	17	23	15	13	54
10. Order.....	25	0–100	22	22	12	11	56
11. Following Suggestions	24	0–50	25	29	10	10	42
12. Accord.....	26	0–60	33	31	10	10	38
13. Studiousness..	24	0–53	30	28	12	11	44
14. Social Factor..	23	10–66	36	36	11	7	28
7. Compared with 11	24	0–77	30	31	14	10	38
8. Compared with 12	24	7–60	33	32	10	8	36

Both the M. V.'s, which vary from 10-15, and the P. E.'s, which vary from 7-13, make evident the fact that there was little central tendency shown in any of the correlations. The averages themselves vary from 22 to 48, with an average of the averages of 31. The medians are in close correspondence with the averages throughout, diverging more than four points in only one case. Positive correlations of medium degree are evident in all cases except one, or perhaps two. The percents of displacement between general merit and personal appearance show a median of 44 and an average of 40, with a P. E. of 7. This leaves a positive correlation of a very slight amount at best. The lowest correlation obtained exists between health and general merit, the average and the median being respectively 48 and 50. It should be said, however, that the figures in this item are the most un-

reliable of the entire table. Only 18 out of the 26 supervisors supplied the data for health, and a number of the others expressed doubt as to theirs. The difficulty appears to be that the health of teachers, and of others as well, is not readily judged on the basis of anything short of a medical examination.

The highest correlations are found with teaching skill and with the ability to keep order, the medians and the averages being respectively 17 and 23, and 22 and 22. This may indicate that these items are the most important ones for successful teaching in the grades and that they should be given the greatest weight by supervisors in judging teachers.

The positive correlation between length of service and general merit is significant. The correlation is indicated by several other comparisons that we have made. The teaching experience of the 204 teachers for whom data were supplied under this head ranged from a fraction of a year to 34 years, with an average of 10 and a median of 8; 25% had taught less than five years, while 26% had taught over 14 years. The average and the median number of years taught by the teachers ranked first were respectively 14 and 10.5 years, and for those ranked second, 12 and 10.5 years. No teacher ranked either first or second had taught less than 5 years, and only 4% had taught more than 25 years. The average number of years taught by those ranked lowest was 8 years, and by those ranked second lowest, 9 years. The medians for these were respectively 4.5 and 6 years. When the two oldest teachers are removed from the lowest group, the average drops to 6 years, and when the one oldest is removed from the second lowest group, the average drops to 8 years. These three teachers had taught respectively 24, 30, and 32 years; 70% of the teachers in the first rank, 60% of those in the second rank, 40% of those in the second lowest rank, and only 30% of those in the lowest had taught 10 years or more. This indicates either that teachers keep on improving and passing to higher ranks for at least 10 years, or that the poorer teachers are gradually eliminated from the serv-

ice. Both factors may play a part. From the figures as a whole one may infer that a teacher in the grades reaches first-class efficiency in about 5 years, that he maintains this efficiency for about 20 years, and that after about 25 years of service he begins to decline.

The distribution of the good and the poor teachers among the various grades is interesting, although not unexpected; 28% of the teachers ranked first and second were teaching in the first grade and 19% in the eighth, a total of 47% in these two grades. Taking the first and second, and the seventh and eighth grades together, we found in them 69% of the best teachers, leaving only 31% to be distributed among the other four grades. The poor teachers are somewhat more evenly distributed. Regarding the two lowest groups as one, we found 57% in the four intermediate grades, as against 43% in the four extreme grades. The fourth and sixth grades together contained 38% of the poor teachers.

The distribution of the salaries appears to correspond closely with the distribution of teaching merit. We obtained the salary schedules in only nine systems, which is too small a number upon which to base any sweeping conclusions. Four out of these nine paid equal salaries to all their teachers, but, beginning with the first grade, the average salaries per month in the other five systems were respectively $70, $62, $61, $58, $63, $64, $73, and $77. They made a saddle-back corresponding to that made by the distribution of the best teachers.

The second item of information that we secured pertained to the preparation of the teachers. It called for the highest certificate, diploma, or degree held. Data under this head were given for 196 teachers; 47% of these were normal school graduates, 36% were teaching on certificates, 9% held college degrees, 6% were high school graduates merely, and 2% were trained as kindergartners. Basing our percentages on the numbers in each group, we found that 28% of the normal graduates occupied first and second rank, that 21% of the certificated teachers occupied these ranks, that 17%

of the college graduates did, and that no mere high school graduates or kindergartners occupied these ranks. The percentages in the two lowest ranks were distributed in a reverse manner; 16% of the normal graduates were found here, 21% of the certificated teachers, 36% of the high school graduates, 44% of the college graduates, and 50% of the kindergartners. In regard to the kindergartners it should be noted that their number in our lists was too small to give reliable results.

The normal graduates are clearly in the lead as successful teachers in the grades, and this advantage may be owing entirely to the training that they have received. They comprise the only one of our groups that has been formally trained for grade teaching. College graduates apparently do not make an enviable record as grade teachers, and the same may be said of people with only a high school preparation. The main cause of this is no doubt the factor of training, but with the college graduates the factor of selection very likely also plays a part. The better college graduates as a rule seek and obtain high school positions, leaving the poorer ones to accept positions in the grades.

A word should be said about the reliability of our data. That they possess some reliability is indicated by the consistent manner in which the various results hang together internally, and by the way they bear out the conclusions of common experience. But their amount should unquestionably be greatly increased,—a task hampered chiefly by the feeble spirit of coöperation among supervising officers,— and the rankings should be made by recognized experts throughout. If possible, too, each corps of teachers should be ranked by two or more experts. We had but one corps ranked, independently, by two people and in these two rankings there is considerable divergence. The average displacement between them is 25%. It also happened that one of the writers ranked one corps twice. He did this without knowledge and only later discovered the fact in the records. In these two the average displacement was only 14%.

MEASUREMENTS OF THE PHYSICAL GROWTH OF TWO CHILDREN.

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For some time I have felt that our knowledge of the physical growth of the child is seriously defective in that we have few if any systematic measurements of the development of the body as a whole and in parts. Furthermore most of the physical measurements that have been taken have been of more or less large groups of children, different groups for different ages, and the average measure for each age has been taken as the standard for that age. On this basis the relative and absolute increases of different years and periods have been computed. It is possible that all the supposed facts thus brought to light, except those of the most general character, may be quite spurious, on account of the great individual differences which may exist in the subjects. On account of these differences it may be that the variations within a group of a given age are such as to completely obliterate all the actual peculiarities of the curve of growth.

In view of these things it is easy to see that there is a need for systematic measurements of individual children taken at regular intervals for several years. It would be important also that such a series of observations begin at birth and continue until maturity. Manifestly it is only with data of this character that we can hope to reach any definite conclusions as to the nature of correlations between mental and physical development. Only by the examination of such individual records can we hope to arrive at any conclusions regarding the presence and relationships of rhythms of growth and retardation.

Having these things more or less in mind, I have attempted to take regular measurements of two brothers. The initial measurements were, in some cases, taken at birth and in others at the end of the first, second and third months. Height and weight were measured and also the limbs as a whole as well as their parts. Various measurements of the head were also attempted. The data here presented, except in the case of weight and the head measures, relate only to the increase in length. I attempted at first to measure the increase in the circumference of the different portions of the limbs and of the body, but as the subjects were very fat babies the figures thus obtained seemed to have no permanent or even definite significance for the general problem of growth.

The apparatus used consisted of ordinary spring scales for determining the weight, non-stretchable tape lines for the head measures, a centimeter stick and yard-stick for the height and limbs, and callipers for taking the length and breadth of the head.

The measures were taken less regularly with the first child. (See chart 1.) They were, however, carefully made and extend from the end of the first month until the present time (January, 1910), a period of six years and four months. In the case of the second child (Chart II) the measurements were more frequent and regular and cover a period of three years and four months. The first boy was born September 24th and the second three years later, September 20th. These dates are given that the reader may take into account the time of year in the examination of the various fluctuations exhibited by the curves. Whether this has had an influence upon the rate of growth I am not prepared to say. The possibility of seasonal variations should, however, be kept in mind. Both boys have apparently been normal in all respects and have at no time had serious or protracted sickness. Their only ailments have been occasional light colds and equally light attacks of measles.

The following is a brief statement of the method followed: I attempted to take as carefully as possible the weight (always nude), height in bare feet, length of entire leg, of the thigh, of the portion below the knee, of the entire arm, of the humerus, of the forearm to the end of the thumb. The head was also measured as follows: First, circumference; then from a point at the top of the joining of the ear with the head (1) over the brow, (2) at the hair-line (this is doubtless a varying point in different children, but in a given child it is sufficiently fixed for this purpose. It was chosen because it was in these cases conspicuously depressed at birth, a condition more or less true of all babies, I believe); (3) one inch back of the hair-line, (4) vertically over the head from the same points at the joining of the ears with the head and (5) similarly at the crown. In the case of the first child only the circumference of the head and numbers (2) and (4) of the last named measurements were taken. I also attempted to measure the increase in the back of the head, but found it impossible to do so with any approach to accuracy. The length and breadth of the head were taken in the usual way with suitable callipers and the cephalic index computed therefrom is given in the accompanying charts. It will be noted that this exhibits some interesting fluctuations in both cases. In connection with this data it will be of interest to know that the cephalic index of one of the parents is 78.8 and of the other 81.8. Due precautions were taken to make all these head measurements as much as possible underneath the hair, and I do not believe that changes in the quantity of hair are a source of serious error in the data here presented.

The following explanation of the periods into which the charts are divided should be here noted.

I. Pre-grasping period to the 4th month.
II. Development of grasping 4th to 6th month.
III. Movements preliminary to creeping 6th to 10th month (Chart I).
6th to 8th month (Chart II).
IV. Creeping and walking 10th to 17th month (Chart I).
8th to 18th month (Chart II).

V. Preliminary talking period 17th to 24th month.
VI. Rapid development of speech 3rd year.
Questioning, drawing, collecting interests strong in 4th to 6th years.

The fundamental difficulty in taking such measurements is that of getting perfectly fixed points from which to start. In the case of the leg there is a crease in the crotch where the leg joins the body that seemed to be a fairly constant point from which to measure. The distance from this to the extremity of the heel was taken as the length of the leg, the thigh being separated from the lower part of the leg by a crease in the skin under the knee which seemed to be constant. Similar creases in the skin were found in the arm pit and under the elbow. The distances from these creases to the end of the thumb were taken. Some persons may object that these points being only surface ones are too unstable to afford accurate determination of growth. However, I do not see how any greater accuracy would have been obtained by attempting to measure from points on the bones that would have had to be located superficially through a to measure the distances between such points by means of considerable layer of fat. In fact, the attempt was made callipers, and it was found that the possibilities of error were greater than in the method adopted. In every case the measure was taken a number of times until it seemed that it had been obtained as accurately as it could be.

Considerable difficulty was experienced in obtaining accurate head measurements, as the tape line slips easily on the head of a squirming baby, and one feels the need of more than two hands in the process. Since the taking of these, a simple apparatus has been devised for holding the tape in position at the ears while the different dimensions from the brow to the back of the head are taken.

The presumption of a fair degree of accuracy in all the measurements is supported by the fact that, as shown graphically in the charts, there were about the same accelerations and retardations in the percentage of increase of the measurements in which there was a very slight possibility of

error; e. g., in the case of weight, height, circumference of head and cephalic index, as in those in which the possibility of error was great.

TABLE I.

(*Initial measurements upon which Chart I is computed.*)

Weight,	10 lbs.	at birth.			
Height,	20½	inches	at birth.		
Circumference head,	15¾	"	on	51st	day.
Vertical over head,	8¾	"	"	"	"
Forehead at hair-line,	9¼	"	in	14th	week.
Entire leg,	8¾	"	"	"	"
Thigh,	3⅛	"	"	"	"
Heel to knee,	5⅝	"	"	"	"
Entire arm	8⅛	"	"	"	"
Humerus,	2⅜	"	"	20th	"
Forearm,	6¾	"	"	"	"

TABLE II.

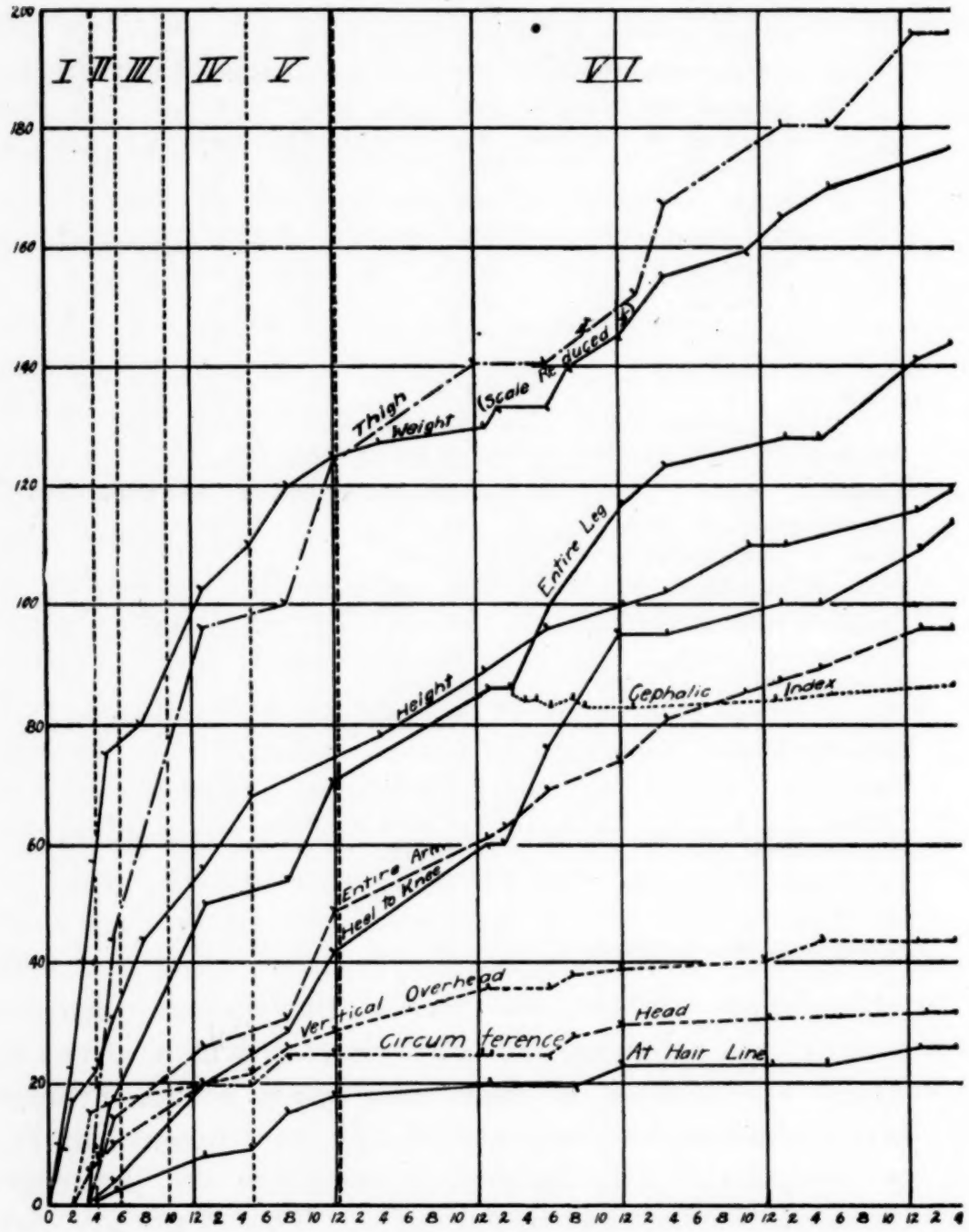
(*Initial measurements upon which Chart II is computed.*

Weight,	10 lbs.	at birth.			
Height,	22½	inches	end of	4th	week.
Circumference of head,	43 c m	"	"	11th	"
Brow at protruberance over eyes,	23 c m	"	"	"	"
Brow at hair-line,	24 c m	"	"	"	"
One inch back of hair-line,	24 c m	"	"	"	"
Vertical over head,	25 c m	"	"	"	"
At crown,	25 c m	"	"	"	"
Length of head,	14.9 c m	"	"	"	"
Breadth of head,	11.6	"	"	"	"
Entire leg,	7¾ in.	"	"	4th	"
Thigh,	3⅛ in.	"	"	"	"
Heel to knee,	4⅝ in.	"	"	"	"
Entire arm,	7¾ in.	"	"	"	"
Humerus,	2½ in.	"	"	"	"
Forearm to end of thumb,	5¼ in.	"	"	"	"

In the above tables are given the initial measurements and by referring to the charts, which give the percentage of increase in each case when a measurement was taken, the absolute increase of any part in any interval can be computed. The figures at the sides are per cents. and those at the bottoms are months. The years are indicated by heavy lines, and the dotted vertical lines between indicate the periods within which certain motor co-ordina-

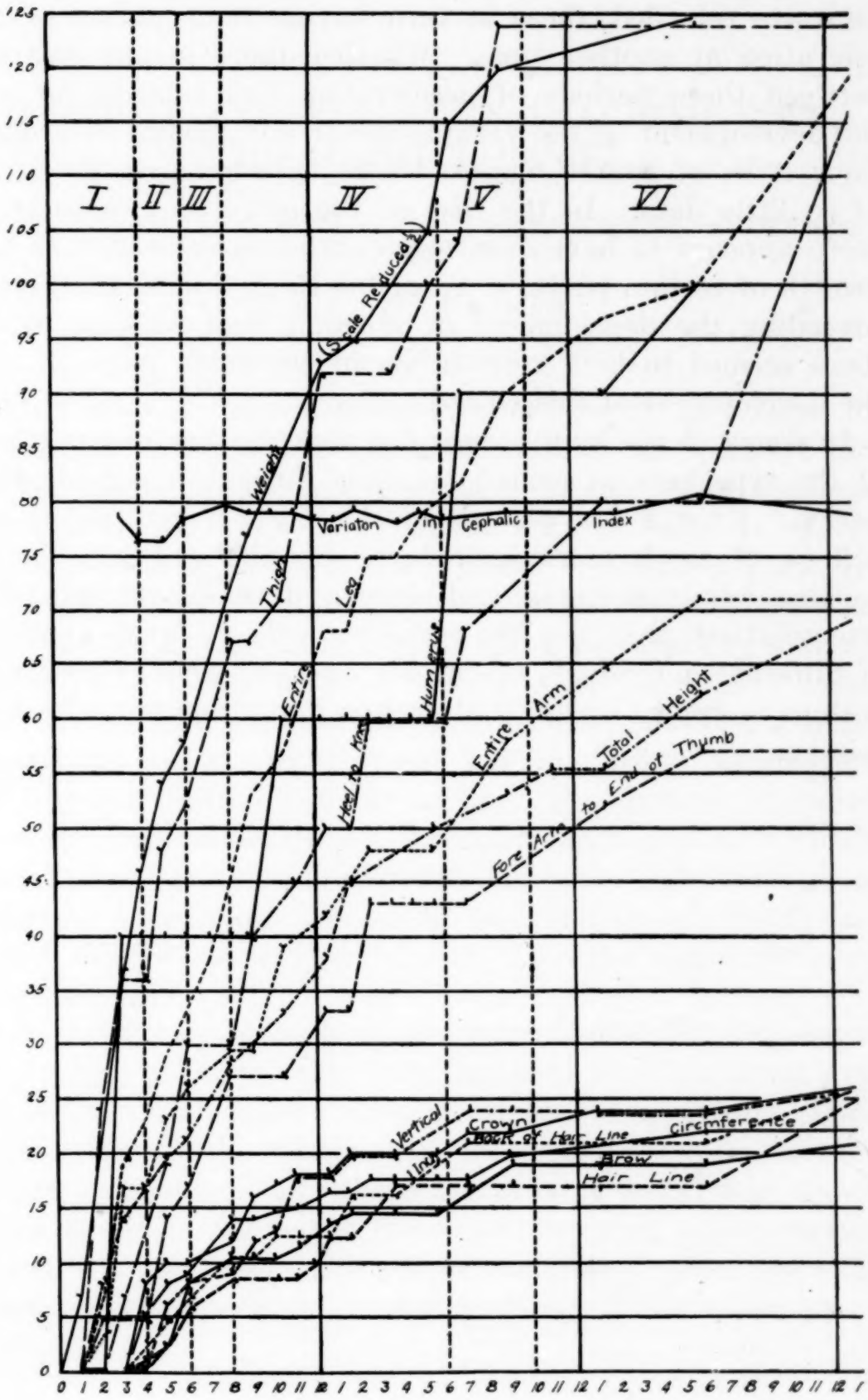
tions and striking mental characteristics developed. The points at which measurements were taken are indicated by marks on the curves wherever the changing direction of the curve does not itself show the points.

Chart I.



It will be noticed from these curves that it frequently occurs when one limb or section of a limb is increasing rela-

Chart II.


125
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I
II
III
IV
V
VI
Weight (Scale Reduced ½)
Variation in Cephalic Index
Third
Leg
Entire
Hum erus
Heel to Top
Entire Arm
Total Height
Fore Arm to End of Thumb
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Crown
Back of Hair Line
Circumference
Brow
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0 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1

tively rapidly, that the other limbs or sections of the same limb are retarded, these in turn having their period of acceleration at another time. Whether there is any relation between these periods of acceleration and retardation and the development of the various motor and mental co-ordinations it is, of course, impossible to determine on the basis of so little data. In the case of the oldest boy, especially, there appears to have been more or less acceleration in the growth of certain parts; e. g., of the thigh during the period preceding the development of creeping and walking, while there seemed to be a retardation of the same parts during the development of this co-ordination.

It seems to me highly desirable that further observations of the type here presented be made through a considerable period. Even a few records of this sort, if carefully kept, will be of much more importance for the working out of various details of mental and physical development and their interrelations than are the measurements of large numbers of different individuals taken only once, of whom practically nothing is known except that each is approximately of a certain age.

THE USE OF EXPERIMENT IN TEACHING EDUCATIONAL PSYCHOLOGY.

Report of the Meeting of New York State Teachers of Educational Psychology, held at Ithaca, April 8 and 9, 1910.

W. VAN DYKE BINGHAM.

Teachers College, Columbia University.

What does a teacher of educational psychology hope to gain by introducing experimentation into the work of the course? Is his main purpose to make the course more attractive, or to gather new experimental data of value to educational science, or to begin the training of young psychological investigators, or merely to familiarize the students with experimental methods and ideals? Does he expect by making use of experiments to teach the facts of his subject more rapidly or more surely than is otherwise possible? What educational returns compensate for the hours taken from the regular routine of instruction, the money expended for apparatus and supplies, the drain upon the instructor's time and energies which efficient management of experiments demands? By what criteria is the relative worth of particular experiments to be judged? To what standards must they conform?

These are some of the questions which challenged the thought of a group of New York State teachers of educational psychology on the occasion of a meeting held at Ithaca, April 8 and 9. Out of the spontaneous, informal discussion emerged certain conclusions, and these the present writer has undertaken to summarize in the hope that they may prove suggestive to a larger circle of teachers when they reflect upon the functions of experiment in the teaching of educational psychology.

Dr. Bell launched the subject by outlining the experimental work as now conducted at the Brooklyn Training School. Here one period a week, or twenty per cent. of the time of the elementary course, is devoted to work in the laboratory. A variety of experiments is provided, ranging all the way from the mapping of the blind spot to tests of the rapidity of learning. Each student has in his special charge some one experiment and also serves as observer in several others. In his capacity as observer he is brought squarely face to face with the data of psychology; he is compelled to introspect, and to introspect systematically. Thus he not only gains power and skill in self-observation; he also carries from the laboratory into the class room a body of freshly gathered fact about his own mental life which adds concreteness as well as interest to the whole course.

This method of conducting the experimental work yields a value to the student as experimenter upon which Dr. Bell laid much stress. It develops tact and insight into human nature. In modifying his questions so as to elicit the fullest and most adequate introspective report from each of his many observers the student gains valuable practice in questioning, and in adapting his attitude to differing temperaments and types. These abilities have a direct application in the school room. Dr. Bell is convinced that these advantages are of sufficient importance to warrant the additional expenditure of time on the part of the instructor which this "laboratory method," as contrasted with the "method of the class experiment," involves.

As illustrative of certain very different uses to which experiment may be put, Professor Norsworthy described an experiment in memory which has proven its worth in her classes in Teachers' College. Her aim in using this experiment is partly to create in the students a respect for scientific data as contrasted with mere general opinion or with "my experience." As a preliminary to the experiment the class is led to consider the relation between rate of memor-

izing and retentiveness. Nearly everyone is positively certain that the slow learner retains long and well what he learns, while the quick memorizer soon forgets; and to this fallacy of "easy come, easy go" the large majority of the students insist upon committing themselves. The experiment consists in memorizing a German-English vocabulary. To this is devoted twenty minutes a day, five days a week for three weeks. At the close of each daily study period the student turns to a set of test sheets and writes the English equivalents for the words he has learned. One week after the completion of the practice series and again after one month has elapsed tests are given consisting of fifty words chosen at random from the portions of the vocabulary which all have learned. When the results are tabulated the class sees that those who learned the fewest words in the given time retained the smallest instead of the largest percentage of what they had learned. Their astonishment is wholesome and mentally invigorating. Henceforth they have a new respect for fact in the realm of psychology, and begin to cultivate a healthy skepticism regarding unsupported assertions and unverified aphorisms.

Miss Whitley described some of the experiments in perception, analysis, practice and fatigue which Professor Thorndike uses in connection with a large lecture course at Teachers' College. These are partly class experiments and partly experiments to be performed at home by each student individually. They have the immense advantage over mere demonstration experiments that they make each student an active participant.

Dr. Piez, describing some of the devices he has found useful in his teaching at Oswego, urged that the main purpose of experiment was illustrative and that it should serve as a point of departure for class discussion.

Professor Rejall, of Albany, suggested that owing to the high educational importance of the facts of individual differences, one of the main purposes of the experimental work should be to bring these differences clearly to view.

Several rather special purposes were also mentioned, but these it is not necessary here to elaborate, as they are only particular aspects of the larger aims already stated. The larger aims, it seems to me, reduce to four:

(1) The chief end of the use of experiment is *to teach* more efficiently *the facts* of educational psychology, by stimulating in each student a lively mental reaction, by compelling introspection, by making the experiences studied more vivid and concrete, thus adding interest and attractiveness to the whole course.

Other purposes of comparable importance are (2) to secure a wholesome *respect for facts* and a discontent with mere opinions or unsupported assertions regarding the mental life; (3) to develop, as all science teaching should strive to develop, a growing *familiarity with scientific methods and ideals;* and specifically (4) to give a certain elementary *training in the technique* of psychological experimentation. Of these four aims, only the one last mentioned can be ignored without danger of distinct loss to the student.

Any experiment, to realize these aims, (1) should employ the simplest possible technique and materials; (2) should be economical of time; (3) should be clearly relevant; (4) should, as Professor Seashore has recently pointed out afresh, be sufficiently intensive to make it vital; [1] and (5) should be unequivocal in result. Moreover, (6) care should be taken to guard against the introduction of experiments that make the student feel foolish or that tend to show the "superiorness" of the instructor. And finally, (7) in order to insure a maximum of *educational* interest and value, it is desirable that experiments be selected as far as possible from the educational experience of the students and should have an obvious relationship to school situations and problems of teaching.

In applying these criteria to the selection of individual or class experiments many complex problems arise. The length

[1] "The Class Experiment," this JOURNAL, Vol. 1, No. 1, p. 26.

of the course, the amount of available room and equipment, the size and maturity of the class and the nature of their previous scientific training, psychological and otherwise—these and many other factors will modify the relative emphasis upon the various aims. For example, if the course in educational psychology is closely allied with courses in methods, it may be desirable, as Miss Long of the Rochester Training School suggested, to connect the experimental work with the work in observation.

Only a beginning was made at compiling a suitable suggestive list of experiments. This will be one of the important topics for subsequent meetings to consider. Meanwhile it is highly desirable that teachers of educational psychology should be searching for experiments that most closely fit the needs of the elementary educational psychology course. It was the sentiment of the meeting that about ten per cent. of the total time of the course could profitably be devoted to experimental work.

At the beginning of the Friday evening session Professor Whipple led a discussion on the teaching of the nervous system, the topics to be emphasized and the time to be apportioned to each. For the most part, a surprising unanimity of opinion prevailed, except upon the general question of the value of the study of the nervous system. Professor Titchener stoutly argued that since the physiologist knows so little about neural processes within the brain, the less the psychologist has to say about the nervous system at present the better.

Miss Clarke of Kansas University, at present a student at Cornell, read a paper on the introspective analysis of the thought processes and reported the results of an experimental study of certain characteristic attitudes, of surprise, doubt, interest, assent and the like. Using Woodworth's device of proportions for bringing feelings of relationship into clear consciousness, she has obtained results contradictory to those

he has reported, finding in the analysis of several hundred attitudes not more than two possible cases of "imageless thought."

Professor Titchener gave a general account of the researches now in progress under his direction, and opened all the rooms of the capacious and marvellously equipped laboratory for inspection. An enjoyable social hour in the seminar rooms brought the evening session to a close.

In order to continue these meetings of educational psychologists no formal organization was deemed necessary; but the arrangements for a meeting next year were left in charge of a committee consisting of Professor Whipple, chairman; Dr. Chase of Buffalo, Professor Forbes of Rochester and the writer. It is not certain whether the meeting will be held at Rochester at the time of the Christmas meeting of the State Teachers' Association, or at Easter time. The topics suggested for discussion, in addition to those already mentioned, include the order of presentation of topics in the educational psychology course.

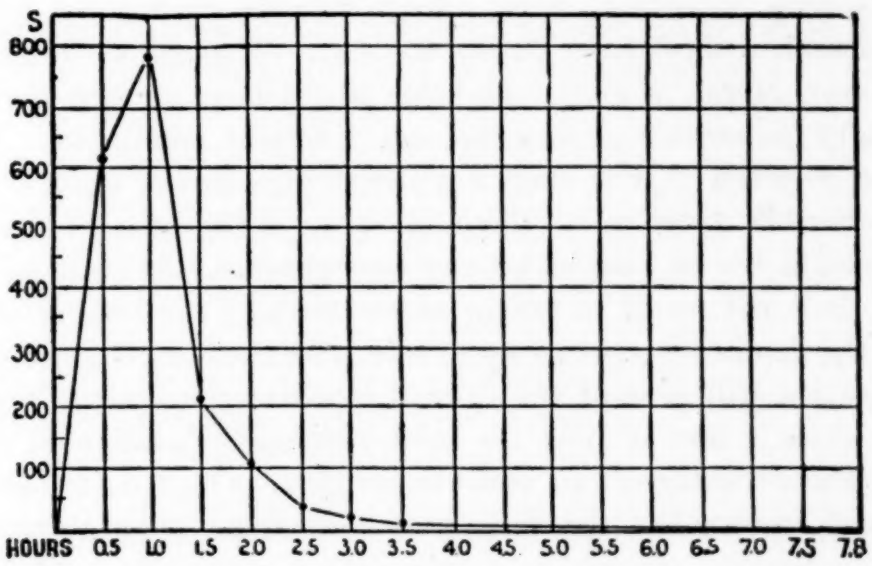
COMMUNICATIONS AND DISCUSSIONS.

THE MID-DAY NAP.

One year while I was at Yale, I approached the physical director, Dr. Seaver, on a balmy April day and asked him to prescribe a tonic. He looked me in the eye, and the following conversation ensued:

"What is the first thing you do after dinner?" "I go to work—study." "Are you a gentleman?" "I am trying to be." "Are you a Christian?" "I am trying to be." "A Christian gentleman, and take no rest after dinner!"

I took that rest tonic as prescribed, have continued to take it, and have had no need of any other. It has assumed the form of a fifteen-minute mid-day nap, my principal meal coming at noon. Realizing the great benefit in this, I have been interested in casting about for a psychological justification of it.



This I find chiefly in the curve of sleep. The curve of sleep, as measured by the relative strength of stimulus required for awakening a sleeper at different stages of the sleep, is shown in the accompanying figure (Kohlschütter). The numbers at the bottom indicate hours

of the sleep; the height of the curve shows the height, in centimeters, from which a ball must be dropped upon a metal plate in order to awaken the sleeping person. The curve shows that the normal sleeper falls immediately into a profound sleep which reaches the maximum at the end of the first hour, then becomes lighter very rapidly during the second hour, and remains light for the rest of the night. Quantitatively, the sleeper gets more needed rest out of the first one-fourth of the night than out of the remaining three-fourths.

This relative form of the sleep curve has been verified for various conditions. The feature which concerns us is that the greatest benefit from normal sleep, night or day, comes from the very first part of it. From this we may derive a principle of mental economy: *Cut short the long light sleep of the late morning hours and substitute a short sleep at some favorable time during the work day.* Fifteen minutes of sleep after the heaviest work and the main meal of the day will count more for efficiency than five times fifteen minutes of sleep in the morning. The curve of day sleep has the same form as the curve of night sleep; but is usually very much smaller. From ten to twenty minutes would cover the period of deepest sleep in the day rest of a normal brain worker.

But several conditions enter. Many persons cannot fall into sound sleep in such a short time during the day. The ability to go to sleep is, however, largely a matter of habit which most persons may readily acquire by reasonable persistence and favorable conditions. The nap must be so taken that it shall not interfere with the night's rest; the most favorable duration of the nap varies with different individuals, but it should not be long under any circumstance. It must be so taken that it shall not result in stupor at awakening; the best precaution is to take the nap in a cushioned easy-chair, with the body slightly reclining. This position will prevent the rush of blood to the brain. The advantage of sleep is that it gives the most adequate relaxation of body and mind. The advantage of an after-dinner cigar is that it furnishes relaxation and repose; but the feeling of restfulness after a quiet smoke is due in part to the artificial stimulation while the restfulness felt after a nap is the natural feeling of restoration.

Brain workers seldom die of brain disease. They, ordinarily, die of stomach trouble or related organic disorders, and in most cases this

is due to the fact that there is no cessation in the brain work during the day and the stomach suffers in competition with the brain for vital energy. The nap serves two purposes after dinner in that it rests the brain and gives the stomach a chance.

In the coming fight for health and natural living, the demand for economic periods of effective relaxation will be a feature. And for effective relaxation, when circumstances permit it, I know of no more efficient form than the mid-day nap.

C. E. SEASHORE.

University of Iowa.

The department of psychology of the University of Minnensota has organized a free clinic for the study of mental development. Dr. H. H. Woodrow, who has immediate charge of the work, is conducting a course in mental retardation. Dr. Woodrow will have the assistance of Dr. J. P. Sedgwick, of the College of Medicine, who will superintend the physical examination of the children, and of Mr. W. M. Duke, a specialist in the correction of stuttering and stammering, who will take charge of the training for the correction of speech defects. A special investigation of speech disturbances will be made.

ABSTRACTS AND REVIEWS.

OLIVE M. JONES, ELEANOR G. LEARY, and AGNES E. QUISH. *Teaching Children to Study.* New York: The Macmillan Company, 1909. Pp. vi., 189.

If the reader expects to find within the covers of this book the usual cut-and-dried prescriptions on "how to teach children to study" he will be sadly—or happily—disappointed. For "teaching children how to study" is simply one of the inevitable consequences of the application of a group system of teaching whose technique is here explained. The nature of the book is thus really more adequately described by its sub-title: "The Group System Applied."

The group system, so the author tells us, has been slowly evolved from a number of other methods of conducting recitations which have been weighed in the educational balance and found wanting. It is a compromise plan, securing the advantages of the other systems while avoiding their defects.

The forerunner of the modern city school was the district school. Its chief merit was the opportunity which it afforded for giving individual training. As the school population increased, however, it became necessary to establish the graded school, so that children of approximately like attainments might be grouped together. But the uniformity of attainment which it assumed was largely illusory. Children of the same age vary from the exasperatingly dull to the phenomenally bright. And since it is the interests of the majority—the average child—that must be conserved in mass education, it was inevitable that injustice was done to the exceptional child, whether the very bright or dull. With this subordination of the individual, teaching began to lose the direct and vitalizing touch which it had in the district school; and verbal memorizing replaced comprehension. To counteract these evils our training schools organized a highly elaborate technique in teaching-method and lesson-planning. Teachers were thoroughly drilled in constructing plans, embodying subject-matter and method, by following which the child's mind could be effectively prepared to assimilate the new matter and be led to make the comparisons, abstractions, generalizations and applications demanded by the adequate mastery of a lesson. This emphasis upon the instruction

aspect of the teaching process, praiseworthy as it is, resulted in a neglect of the drilling and testing aspects, and proved to be especially subversive of the habit of independent and self-reliant study on the part of the pupil. He learned to depend upon the teacher to make everything clear, and was not trained to exert his own efforts.

Recognizing these defects of grade teaching, educational experimenters have evolved various substitutes or variants of the grade plan. The study periods have been relatively lengthened and the pupils given opportunities to work under the teacher's direction (Pueblo plan); or the rate of progress has been made variable, so as to afford stopping places for the slow and allow the bright pupils to forge ahead (Cambridge plan); or pupil teachers have been appointed to assist the weak; or the program has been divided into alternate class and study periods (German Blocking System); or it has been so constructed as to allow regular periods of individual instruction from the teacher to alternate with class recitations (Batavia plan); or the children of one room have been divided into four or five rigid groups, maintained for fixed periods, with promotion from group to group (Elizabeth); or the division of the grade into sections for slow and bright pupils, or for slow, bright and over-age pupils, progressing at different rates, with promotions at the end of the term (New York City); or the establishment of special classes for three kinds of pupils, immigrants, over-age pupils, and pupils entitled to leave school for work by virtue of their age, but lacking in the scholastic requirements (New York). The latter plan was a sort of reversion to the type of the district school (with a number of grades in a room), but it brought together pupils who could not be taught as a unit, and consequently led to the experiments in New York City with the group plan in the regular classes, of which this manual is a valuable exposition.

The author distinguishes three types of grouping. In the oldest, the *constant group plan,* the pupils remain for fixed periods in the *fast,* or *normal,* or *slow* group in which they have been placed. The grouping is maintained throughout the course. It aims especially to advance the bright pupil. The *grade-group plan* is feasible in large classes. All the pupils in a grade constitute one class grouped into slow, normal and fast groups. The groups are constant in a grade as a whole, but the shifting plan obtains within the class in at least English and arithmetic.

In the *shifting group plan,* which is the ideal one for graded schools, the pupils are grouped into three variable or shifting divisions. The grouping is determined by testing the class on a lesson which has been presented to the class as a whole. This gives two groups: those who fully comprehend the new points presented and who accordingly only need further drill (A), and those whose mastery is defective and need further instruction. These are then instructed again during the following period, and likewise tested. On the basis of the mastery displayed they are subdivided into two sections, B and C. B now receives the same drill (seat-work) that A received in the previous period. In the first half of the third period A is quizzed by the teacher on the previous day's work, C listening meanwhile or doing seat-work; and in the second half the pupils in C get individual attention. Finally the class is tested as a whole, to determine whether to proceed to a new step. When the new matter is presented it is presented to the class as a whole. After tests as before described they are grouped anew into three divisions. Thus the grouping constantly shifts, as dependent upon the degree of mastery of the new step which the pupils show. The greatest variation in the grouping will be in arithmetic and grammar, but it will tend to grow progressively more and more constant, especially in reading.

The advantages of the shifting plan are: It allows alternation of study and instruction periods, individual instruction as well as whole-class recitations; it enables the teacher to detect the specially weak pupil and does full justice to both the weak and the strong; it requires grouping only in some branches and these are in the essentials; it restores the drill to its rightful place in the teaching process; the drills are made dynamic by requiring the child to apply in his seat-work the knowledge acquired to new instances and in new forms; the drill thus gets a new interpretation in terms of self-reliant study. The two most pronounced merits of the plan perhaps are that it inculcates habits of independent study and brings the laggard up to grade.

Separate chapters are devoted to a discussion of the limitations and difficulties of the plan (logically this chapter should have come after an explanation of the plan), the questions pertaining to the program, the instruction and study periods. To assist the novitiate in the management of the study period, more than half of the book is devoted to describing plans for seat work in reading, arithmetic, composition, geography, etc. This material is, for the most part, very judiciously

selected, but it supplies but a small nucleus of the material which every teacher using the plan must have at her ready disposal.

To the extent that the shifting group plan fulfills its avowed mission it supplies an educational instrument of the greatest value. The problem which it attacks constitutes one of the most vital questions before the educational expert of the day: the adaptation of educative forces to the needs of the special pupil; getting hold of the individual child. Whether the shifting group plan of recitation is able to wrestle adequately with the problem is another question. The scheme, until it has been rendered automatic in its operations, must be very cumbersome, time consuming and confusing to the teacher. It is doubtful whether, with it, a scientific program can be constructed, one having regard for the course of diurnal fatigue. Nor would it seem possible to get around in one period to all the pupils sufficiently well to determine their grouping. But the possibility of constant regrouping will minimize this objection. In the reviewer's opinion, the individual pupil will not get the training to which his birthright entitles him until, by law, every child that enters the portals of the school is subjected to a physical and psychological examination, and placed in a special room with his similars, according to the results of these examinations. True educational economy will some day demand that the average grade pupils be grouped by themselves; that the very bright be segregated in another room, and the dull in still another; and that specially qualified teachers will concentrate all their energies upon the training of only one of these groups. This is probably Utopian, so far as the immediate future is concerned and so far as concerns the average grade school.

Miss Jones' discussion may be commended as a clear and straightforward exposition of the group system, and it is to be hoped that the plan will be given the thorough experimental testing in our elementary schools which it merits. It offers an excellent starting point for mass tests in experimental pedagogy.

J. E. Wallace Wallin.

Cleveland Normal Training School.

W. WUNDT. *Ueber reine und angewandte Psychologie.* Psycholgische Studien, 5: 1 u. 2.Heft, June, 1909. Pp. 1-47.

"Es ist nicht genug zu wissen, man muss auch anwenden." Taking as a text these words of Goethe's "Wanderjahren," the author discusses some of the dangers into which present-day psychology, in its effort to put its results to practical uses, seems to him to be falling. The first section of the article is devoted to an appreciation of the pressing need for the application of psychological knowledge in many widely different branches of investigation, especially in the practical fields of jurisprudence, psychiatry and education. To this end Kraepelin has done extremely valuable service in devising simple tests which give definite answers to certain simple questions and which demand for their use no complicated apparatus and no prohibitive amount of time. In the same category as the Kraepelin tests belong the observations reported by Stern in his "Psychologie der Aussage." It is important, however, to remember, and Kraepelin is careful to emphasize the fact, that neither the Kraepelin tests nor the observations of Stern pretend to give a complete psychological analysis of the processes involved. And for practical purposes this is often not necessary. The judge, for example, wants to know primarily only the probable objective validity of the report of an eye-witness. For the educator, on the other hand, it is of the greatest interest to know whether the inaccuracy of the report is due to faulty perception or memory, to deficiencies of attention, to lack of interest or of practice in observation, or what not. In general, therefore, pedagogy, more than any other branch of applied psychology, presupposes a close dependence on pure psychology.

The influence of practical interests may be seen, further, in the so-called "memory experiments" to which so large a part of the experimental psychological investigations of the day are devoted Among these one may distinguish two different classes. Experiments of the first class, to which belong all those on the "economy and technique of memorizing," are concerned primarily with obtaining results which have a direct practical bearing. Investigations of the second class, on the other hand, have, besides the practical, also a theoretical interest, in that they lead finally to problems of pure psychological analysis. It is evident that results of this second kind of experiments have a much greater general value and a much wider field of applicability than results of the experiments of the first sort. In fact, "every experienced

educator will admit that in coping with the general problems of training and teaching, a well-rounded psychological education is incomparably more fruitful than the collection of a mass of isolated technical observations."

Pedagogical problems may be divided into three classes, the practical-technical, the practical-theoretical and the purely theoretical. To the first belong investigations of pedagogical methods, of practice, fatigue, etc. Among the problems of the second class we have the determination of differences due to natural talent, to age and to sex, as well as the study of the best means for arousing and holding interest. Finally a field closely related to the practical ones but in itself purely theoretical is found in the study of the several directions and phases of the child's development. The close connection of investigations of these three kinds with each other and with pure theoretical psychology is evident. Especially problems of the third type presuppose for their solution detailed and exact psychological kn wledge. And it therefore seems incumbent on theoretical psychology to furnish such knowledge. Just here, however, the demand for practical application seems in part to defeat its own end. For psychology sets for herself the example of the natural sciences, especially physics and chemistry, with their wide applications in the industrial world today, and forgets thereby that both physics and chemistry had a long history of purely theoretical development before they were ripe for industrial application. So it comes about that the attempt of psychology to meet the practical demands of the day brings with it not only certain undeniable advantages, but just as undeniable disadvantages, both for pure psychology and for pedagogy herself. For, in her effort to obtain practically useful results, psychology narrows her field not only to the exclusion of other more fundamental investigations, but also to the detriment of the wider interpretation of the results which she does obtain. And pedagogy is thereby betrayed into the use of experimental results whose true significance and whose limitations she does not understand. Moreover, because of the undue value placed on experiments which allow of immediate practical application, there is too much emphasis laid on external technical questions of instruction. "The teacher who sees himself surrounded on all sides by memory experiments will recur too easily to the old, and as we hoped, happily uprooted superstitution that the technique of memorizing is one of the main aims of teaching, and that through industrious memorizing

all the goals of education are at length attainable." However true it may be that one should not only know but also apply, "it is none the less hazardous to try to apply knowledge that is too limited or rests on too uncertain foundations."

The purpose of the present paper is, however, not to discuss the question from the pedagogical standpoint, but to indicate the harmful effects which the too exclusive emphasis on practical (especially pedagogical) application has had on psychology itself. These are:

First, a tendency to premature generalization of results obtained under restricted conditions.

Second, a tendency to deal with general conceptions which, formed in the first place on the basis of very limited experience, are later used as the explanation of other facts which are subsumed under them. This is nothing more nor less than a return to the old faculty-psychology.

Third, as a result of this premature generalization and formation of schematic concepts, an inadequate and contradictory interpretation of phenomena, which expresses itself now as a failure to take account of actually observed facts, and again as reading into the facts elements that the most careful observation fails to detect, and that owe their supposed existence only to logical reflection.

Practically all the rest of Professor Wundt's article (nearly thirty pages) is occupied with illustrating the above points by a detailed criticism of Ernst Meumann's "Intelligenz und Wille." The criticism is prefaced by an appreciation of Professor Meumann's justly high standing as a psychologist and educator, and by a tribute to the clearness and keenness of observation shown in this work. For this very reason Wundt has chosen this book to illustrate what he means by the harmful influence of practical pedagogy on theoretical psychology. The main points of the criticism are: (1) Meumann's conclusion, "wie können durch Ubung alles erreichen" (p. 42) rests on two illicit generalizations of limited observation: first, the concept of mental work is applied alike to everything from the simplest form of memorizing to the most complicated achievement; and second, conclusions reached for the lowest member of this very broad class are applied without reserve to all its members. Moreover, Wundt sees reason from his own and others' observations to deny the existence of unlimited improvement through practice even in the case of the immediate retention of a series, Meumann's own example.

(2) In his description of the several intellectual capacities (*Fähigkeiten*) and their relation to each other, and especially in his too sharp separation of memory (*Gedächtnis*) and imagination (*Phantasie*), and in his discussion of their influence on each other and on intelligence, Meumann seems to be reviving the old faculty-psychology in an only slightly modernized form. Here again (according to Wundt) Meumann is trying to operate with general concepts instead of with observed and carefully analyzed facts.

(3) Meumann's discussion of the will is criticized on the ground: first, that its extreme intellectualism is not sufficiently established; second, that it fails to take into account any affective experiences but pleasantness and unpleasantness (this, of course, from the point of view of the well-known Wundtian theory of the emotions); and third that it is in several points self-contradictory. These contradictions (again according to Wundt) have their origin in a premature generalization both of concepts and of experimental results, and in a consequent attempt to apply conclusions gained in one field to facts of a widely different nature.

This brings the author back to his main point, namely, that "the premature attempt at practical application leads to the formation of conceptions in which the standpoint of the faculty-psychology repeats itself. The mechanical use of the conception of faculties then allows the foremost task of psychology, the description and the experimental analysis of mental processes, to be pushed into the background. And finally, in and through this effort for practical value, the one-sided emphasis on the psychology of memory and the technique of methods of learning, though it here and there gives useful hints to practical pedagogy, reminds one to a suspicious degree of the formal memory-drill of the older Pedagogues, which we had thought was happily outgrown, and the complete discarding of which ought to be one of the most important duties of psychology in its application to pedagogy. Where modern psychology, through its too eager effort to serve practical ends, results in an out-of-date mnemo-technique in learning and teaching, in the formation of mind and character, then surely these practical consequences can be looked on as a certain indication that theory itself has somehow gone astray."

HELEN D. COOK.

Wellesley College.

J. DEWEY. *The Moral Significance of the Common-School Studies.* Proceedings of the Northern Illinois Teachers' Association, 1909. 21-27.

This paper comprises a discussion of the principles which underlie the effective functioning of educative materials in moral culture. Subject-matter of instruction represents the "results of past human social struggles and achievements." Mind, on the other hand, is a manifestation of primary impulses in their efforts to master the environment. Because of the fact that art and science are something more than mere intellectual products—because of the fact that they "have been worked out in the long-continued, arduous struggle of man to come into sound and effective connection with nature and with fellow-man"—they are full of moral meaning. It follows that when studies are treated purely from the intellectual standpoint they fail of moral influence.

The author criticises the teaching of art because of the neglect of this principle. "Given genuine art . . . . the chief condition of its moral influence is that it be unconsciously absorbed, not consciously driven in, raked over, and pulled up." Dewey's warning here is not new to teachers. Indeed, this important truth has been "discovered" by almost everyone who has spoken or written upon the educational aspects of literature within the past decade. The principle is clear enough, but it suggests only a negative "cue" to conduct. What the teaching of literature stands in direst need of is a set of principles which will suggest what one may do rather than what one must not do.

The advice concerning the teaching of history from the moral point of view is much more positive and explicit. The secret here, of course, is to teach history from the social standpoint. "History affords the materials for apprehending the typical *problems* [of human experience], the chief *obstructions* to development, the chief *methods* of progress." The moral value of history is measured by the extent to which it may be applied to the understanding of present events. The "biographical" method in history is criticised on the ground that it commonly encourages an abstraction of the individual hero from his environment. It is only when the leader is seen "as one individual among many, summing up by guidance their powers, and meeting needs which help in the peculiar social situation in which he lives and works" that biographical stories fulfill their real function in moral training.

Geography quite naturally fulfills a moral function when emphasis is laid upon its social phases. "The ultimate significance of lake, river, mountain, and plain is not physical but social,—the part played in modifying and directing human relationships." It is through the information which geography imparts that its true ethical value is realized, for "morality severed from an understanding of the conditions in which action takes effect is sentimental or else routine."

The treatment of arithmetic emphasizes the necessity for some effective form of motivation. "Let the child get a consciousness of what is the use of number, of what it really is for, and half the battle is won." But "this consciousness of the use of reason implies some end which is explicitly social." Just what place is to be accorded to the instinctive liking of the child for formal and mechanical repetition is not clear. It may be that this "need" ought not to be gratified, notwithstanding the fact that its temperate employment greatly lessens the difficulties of teaching primary arithmetic. Training in neatness, accuracy, etc., is a moral value only when the child can extend these virtues beyond the sphere in which they have been attained, and this is possible "only when mathematical relations are seen in their connection with the realities."

The latter part of the discussion follows, in the main, the author's treatment of the same topic in his *Moral Principles in Education*. Especially consoling in the light of the recent heredity investigations is Dewey's concluding sentence: "If such moral training seems slow and roundabout, we may yet encourage ourselves with the reflection that virtue is not a miracle but a conquest, and character not an accident but the efficacious growth of moral powers."

W. C. B.

ELIZA R. BAILEY and JOHN M. MANLEY, Ph.D. *The Teaching of Spelling*. Pp. 16. *The Bailey-Manley Spelling Book*. Boston: The Houghton-Mifflin Company, 1908. Pp. vi., 154. $0.25.

The spelling book, which is also published in two parts (Grades II-IV and Grades V-VIII), contains a brief explanatory preface, and is accompanied by the short teacher's manual listed first above. In arranging the speller, the compilers sought, they say, both to avoid the mistake of the old method of bringing together in a list words spelled and pronounced alike and of the newer method of introducing each new

word as if it and its derivatives stood alone. The spelling exercises are classified by the year in which they are to be taken up, and are accompanied by short selections of a literary character for the purpose of interesting the child in the study of spelling and of quickening a love for good prose and verse.

The following are the chief principles upon which the authors have based their system: (1) A successful system of spelling must take into account all forms of ideational or memory-type, and not seek to impress words by any single form of memory. (2) Spelling to be perfect must be automatic. (3) The child should not be compelled to learn rare and unusual words, but only those that are needed in the ordinary affairs of life. (4) Teachers must be careful to ensure correct spelling under all circumstances, whether in conjunction with the spelling exercises or in conjunction with other school work. (5) The teacher must devote time in connection with the assignment to aiding the pupil to studying the lesson. (6) "Perfect spelling should be established as the aim of every child." (7) Great care must be taken with pronunciation, especially of new words, both by teacher and pupils. (8) Special devices should be used to enable the pupil to concentrate his attention upon the most probable sources of error. (9) The old-fashioned spelling-match should be used to afford oral drill and to lend interest, variety, and inducement to study. (10) All new words, at least in the first two years, should be pronounced before they are spelled, and spelled orally before they are written. (11) New words are to be introduced by old words having the same elements. (12) To secure successful results, much time must be spent on the first lessons, and each lesson must be mastered, regardless of the time it takes, before the next is attempted. (13) The child should be trained, in so far as possible, to think of the sounds of the letters as he writes.

These principles will appeal to the teacher as being based upon sound psychology and confirmed by practical test.

G. M. W.

NOTES AND NEWS.

Our English friends are evidently concerned about the disciplinary value of the classics. In a contribution of several columns to the *Oxford Magazine,* Professor G. G. Ramsey, who has taught Latin prose for more than forty years to large classes by all the methods that pedagogic ingenuity has devised, extols the disciplinary virtues of this subject. "I have found it," he says, "incomparably my most effective intellectual implement . . . . A student's progress in Latin prose affords the surest index of his mental development as a whole." To which the *Educational Times* (London) rejoins: "Yes, to the Latin professor, but not necessarily to anybody else." So, too, thinks the *Times,* the assertion of the Viennese Professor of Chemistry, who declared: "Give me a boy's Latin grammar and I will answer for his chemistry," is a long jump from the premises. "Latin prose, with all its excellencies, can hardly claim to be so unfailing a specific for breadth of view or for logical conduct of an argument."

The March issue of the *Pedagogical Seminary* is of special importance to those who are interested in school hygiene. Papers in this field read at the twentieth anniversary of Clark University by Drs. Leo Burgerstein, T. A. Storey, G. M. Whipple, H. H. Goddard and W. S. Small, and a paper on medical inspection by G. E. Emery occupy the major portion of the number. Summaries of these articles will appear later in these pages.

Experimental psychologists from Harvard, Princeton, Pennsylvania, Cornell, Bryn Mawr, Clark, Columbia, Smith, Mt. Holyoke and other institutions met at Johns Hopkins University, April 19, 20 and 21. The papers and demonstrations were of varied character and of exceptional interest and the attendance was large. Professor Thorndike explained the methods that were being used in working over the extensive data secured in the tests of Columbia freshmen, and the methods by which he proposes to secure standards for the scoring of handwriting and of English prose. Professor Münsterberg made

a plea for the independent development of applied psychology, with special reference to the applications of psychology to commercial and industrial problems. The other contributions were, for the most part, of a technical character. A feature of the program was the exhibition by Dr. Franz of a monkey whose occipital lobes had been destroyed by section and cauterization, but which seemed to exhibit a normal capacity for visual discrimination.

Among the papers presented at the meeting of the New York branch of the American Psychological Association on April 25 the following were of interest to educational psychologists: "Correlation of Mental Abilities," B. R. Simpson, The Brooklyn Training School for Teachers; "Development of the Sense of Form in Feeble-minded Children," Dr. Henry H. Goddard, The New Jersey Training School for Feeble-minded Boys and Girls; "Indications of Incipient Fatigue," Professor Will S. Monroe, New Jersey State Normal School.

The Minnesota Psychological Conference, which met at the University of Minnesota, April 1, 1910, devoted the whole of the morning session to a Symposium on Retardation. Supt. F. E. Lurton spoke on "Retarded Children in Minnesota Schools," Dr. H. H. Woodrow discussed the "Literature of Retardation," Dr. E. A. Meyerding showed the relation between "Retardation and Physical Defects," and Dr. A. C. Rogers treated "Backward and Feeble-minded Children from the Institution Standpoint." At the afternoon session Supervisor J. H. Harris presented a paper on "An Inquiry Into Children's Interests in Written Composition," and Mr. A. S. Edwards read one on "Suggestibility in School Children."

The Brown University Teachers' Association held its eighth annual meeting on April 22 and 23, 1910. The College Freshman was the general subject at the first session, and at the second "Teaching How to Study" was discussed. At the latter meeting the following papers were presented: "How to Secure from the Pupil Initiative and Independent Effort," by John S. French, Principal Morris Heights School, Providence; "The Study Habit and How to Cultivate It," by Stuart H. Rowe, Brooklyn Training School for Teachers; "How to Study, and Teaching How to Study," by Frank W. McMurry, Teachers College, Columbia University.

The University of Vermont has issued an attractive circular announcing an elaborate course of extension lectures by the members of the faculty. These lectures will be available next year for schools, societies and other organizations throughout the state.

Francis Galton, F. R. S., has made a further donation of £500 for the maintenance of the Francis Galton laboratory for the study of National Eugenics during the year 1911-12.

Professor Lloyd Morgan, for twenty-two years Principal of University College, Bristol, Eng., and now Professor of Psychology and Ethics in the University of Bristol, has been presented with a quantity of plate and books in recognition of his services to higher education.

Andrew Carnegie has given $3,000,000 to establish a fund for the benefit of teachers engaged in the ten principal cities of the United States. One object is to enable selected teachers to study educational methods in other countries.

Mr. B. R. Simpson, of the department of psychology and education, Brooklyn Training School for Teachers, will engage in summer school work in the University of Georgia this summer. Mr. Simpson will offer two courses, one in "Educational Psychology" and one in "Principles of Education."

Dr. Charles Hughes Johnston, assistant professor of education in the University of Michigan, has been appointed Director of the School of Education in the University of Kansas. Dr. Johnston will be succeeded at the University of Michigan by Dr. F. S. Breed, who has been conducting investigations in comparative psychology at Harvard University.

Mr. L. W. Cole, formerly professor of psychology in the University of Oklahoma, more recently instructor in psychology in Wellesley College, has been appointed professor of psychology in the University of Colorado.

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Edmond Cramaussel. *Le premier éveil intellectuel de l'enfant.* Paris: F. Alcan, 1909. Pp. 201. Fr. 2.50.

W. B. Drummond. *An Introduction to Child Study.* Second impression (no date). New York: Longmans, Green & Co. Pp. viii, 348.

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L. C. Gatewood. *An Experimental Study of Dementia Praecox.* Psychological Review Monographs, 11: No. 2, November, 1909. Pp. 71. 75c.

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